



**CONESTOGA-ROVERS  
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## MEMORANDUM

TO: Sheila Desai, U.S. EPA REF. NO.: 056394-07-0003

FROM: Greg Carli/Jeni Quigley/ejh/15/Pwl. DATE: April 19, 2013

CC: Paul Bucholtz, MDEQ  
Jeffrey Lifka, Tetra Tech  
Ray Mastrolonardo, Tetra Tech  
Richard Gay, Weyerhaeuser  
Jodie Dembowske, CRA

RE: **Evaluation of Part 201 GSIC and DWC Exceedances in Groundwater  
Former Plainwell, Inc. Mill Property  
Plainwell, Michigan**

Conestoga-Rovers & Associates (CRA) was retained by Weyerhaeuser Company (Weyerhaeuser) to conduct Remedial Investigation/Feasibility Study (RI/FS) activities at the former Plainwell, Inc. Mill Property located at 200 Allegan Street in Plainwell, Michigan (Site). The RI/FS activities are being conducted in accordance with the terms of the consent decree for the Design and Implementation of Certain Response Actions at Operable Unit No. 4 and the Plainwell, Inc. Mill Property Operable Unit No. 7 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Consent Decree), which became effective February 22, 2005. The RI Report was approved by U.S. EPA on February 26, 2013. FS activities are currently on-going.

Representatives from Weyerhaeuser, the United States Environmental Protection Agency (U.S. EPA) and the Michigan Department of Environmental Quality (MDEQ) met on March 20, 2013 to discuss preliminary Remedial Action Objectives (RAOs) and conceptual remedial alternatives for the Site. During this discussion, questions were raised relative to groundwater flow direction at the Site and the preliminary RAOs designed to address constituents present in groundwater exceeding Michigan Act 451, Part 201 Generic Cleanup Criteria (Part 201 Criteria). The purpose of this memorandum is to: 1) evaluate groundwater conditions along the Kalamazoo River relative to Part 201 Groundwater Surface Water Interface Criteria (GSIC); and, 2) evaluate groundwater conditions across the Site in the downgradient direction relative to Part 201 Drinking Water Criteria (DWC).

Figure 1 shows exceedances of Part 201 Criteria for groundwater samples collected from on-Site monitoring wells during the RI.

### Site Hydrogeology

Based on information collected to date and presented in the RI Report, the uppermost, unconfined, water table aquifer present on the east side of the Site appears to be recharged by the surface water within the Mill Race as a result of the dam located east of the Site. Groundwater flow within this water table aquifer is to the west from the Mill Race (flowing sub-parallel to the flow of the Kalamazoo River) across the Site. Review of the groundwater-surface water interaction indicates that the Kalamazoo River acts as a hydraulic barrier (i.e., the river elevation is higher than the adjacent groundwater elevation) along the entire Site during periods when groundwater elevations are lower (August and October 2012), while at times of higher groundwater elevations (February 2010 and March 2012), the hydraulic gradient is reversed along the northwest portion of the Site and groundwater appears to be discharging to the river, while most of the Site still maintains the hydraulic barrier with the surface water being at a greater elevation than the adjacent groundwater. Information regarding groundwater flow is presented in the RI Report. Groundwater contour maps from the RI Report for January 2010, February 2010, March 2012, August 2012, and October 2012 are included in Attachment A for reference.

### Evaluation of the GSI Pathway

Review of analytical data for samples collected from 11 monitoring wells located along the Kalamazoo River indicates Part 201 GSIC exceedances are present for mercury and arsenic. Mercury concentrations exceed GSIC along the river at MW-3, MW-4S, MW-5, and MW-7 in the northeastern portion of the Site and at MW-12S and MW-12D in the northwestern portion of the Site. Mercury concentrations are generally highest in the northeastern part of the Site and decrease to the west along the river, but increase again at MW-12S/D. No distinct trend is evident across the rest of the Site as mercury concentrations vary from east to west. Arsenic exceeds Part 201 Criteria GSIC at MW-7 and MW-12S.

Based on groundwater and surface water elevation measurements and groundwater flow direction information obtained during the RI, groundwater along the Site boundaries with the Mill Race and Kalamazoo River does not appear to discharge to surface water except in the northwestern corner of the Site during periods of higher groundwater elevations (measurements obtained February 2010 and March 2012). Therefore, the GSI pathway would only be relevant in the northwestern portion of the Site and only MW-12S/D would represent compliance points.

Based on data collected to date, adequate information exists to evaluate the potential for groundwater to migrate to surface water above Part 201 Criteria protective of the groundwater-surface water interface at the Site. The maximum detected concentration of mercury occurred in August 2012 (0.0173 µg/L) at MW-3 on the northeastern corner of the Site. This concentration is well below the MDEQ screening level for mercury of 0.2 µg/L for venting to groundwater presented in MDEQ's Policy and Procedure Number: 09 014 "Evaluating Mercury in Groundwater Plumes Relative to the Groundwater/Surface Water Interface (GSI) Pursuant to Part 201," dated June 20, 2012. According to the Policy and Procedure, concentrations of mercury below 0.2 µg/L are considered to be a de minimis condition pursuant to Section 20120e of Part 201 and activity beyond evaluation will not be required. Exceedances of Part 201 GSIC for arsenic at MW-12S/D can be addressed in accordance with the Part 201 requirements for the protection of surface water from the migration of groundwater consistent with the proposed RAOs presented as part of the March 20, 2013 meeting

**Evaluation of the DWC Pathway and Potential for off-Site Migration of Contaminants**

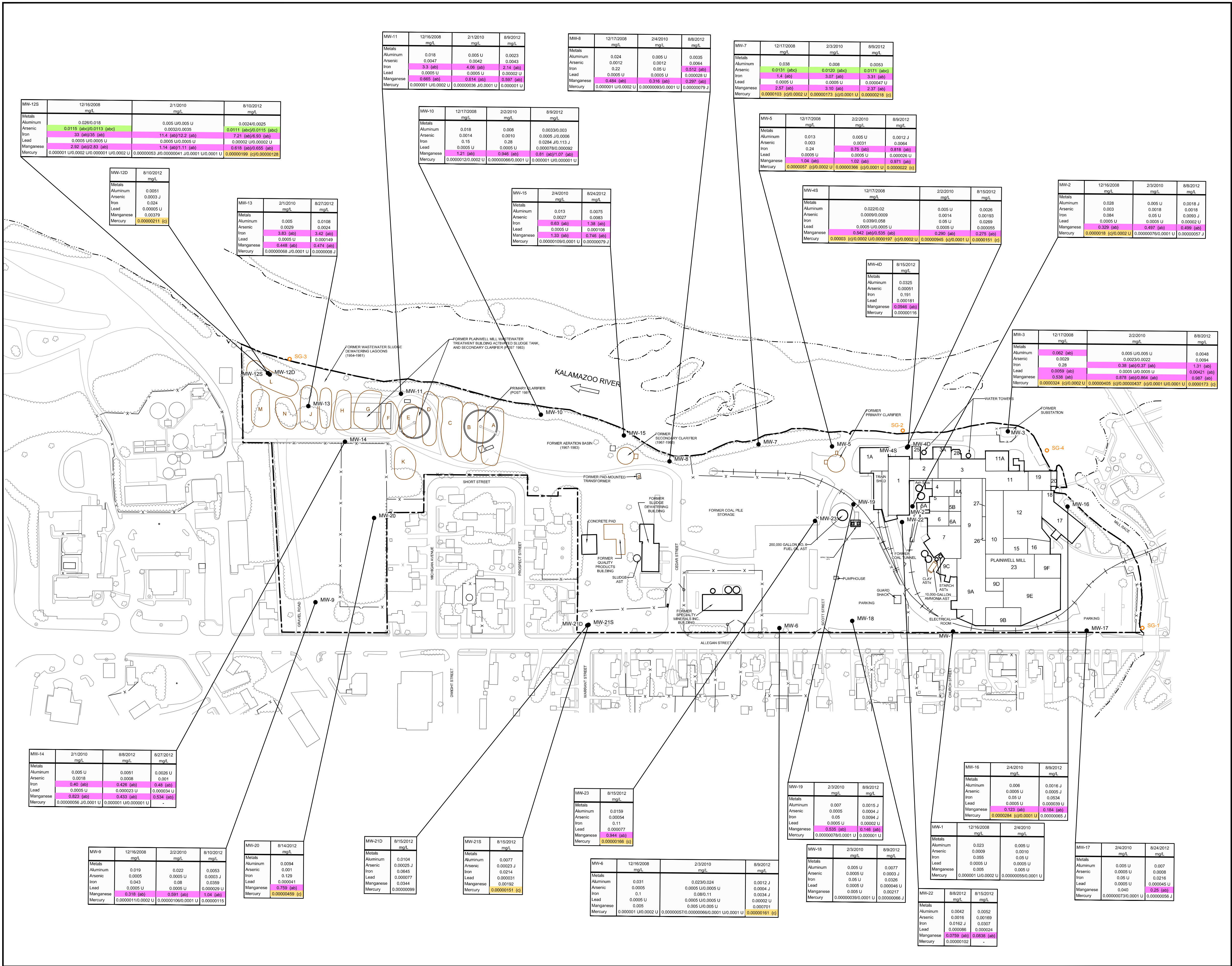
Review of analytical data for samples collected from monitoring wells Site-wide indicated Part 201 DWC exceedances are present for manganese, arsenic, lead, iron, and aluminum. Lead and aluminum only exceeded Part 201 DWC at MW-3 and arsenic only exceeded Part 201 DWC at MW-7 and MW-12S thus the extent of impacts to groundwater associated with these metals is limited in areal extent and within the Site boundaries. Iron exceeds Part 201 DWC only in the wells present along the Kalamazoo River. The Part 201 DWC for iron is based on an aesthetic drinking water value. Comparison to the Residential and Non-Residential Health-Based Drinking Water Values in the "Footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels" dated September 28, 2012 identifies that iron exceeds the Residential and/or Non-Residential Health-Based Drinking Water Values at MW-7, MW-11, MW-12S, and MW-13. No distinct trend relative to iron concentrations is evident in the direction of groundwater flow and the highest concentrations are present in the downgradient wells located in the northwestern part of the Site. Manganese concentrations also vary considerably across the Site with no distinct trend evident in the direction of groundwater flow. Manganese exceeds Part 201 DWC in all of the wells except for MW-6, MW-12D, MW-18, MW-21S, and MW-21D. The Part 201 DWC for manganese is also based on an aesthetic drinking water value. Comparison to the Residential and Non-Residential Health-Based Drinking Water Values in the "Footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels" dated September 28, 2012 identifies that manganese exceeds the Residential and/or Non-Residential Health-Based Drinking Water Values at MW-3, MW-5, MW-7, MW-9, MW-10, and MW-23.

Relative to the potential for off-Site migration of metals exceeding Part 201 Criteria, manganese is present above Part 201 Residential and Non-Residential Health-Based Drinking Water Value in monitoring well MW-9 located nearest to the western Site boundary. Additionally, iron exceeds Part 201 Residential and Non-Residential Health-Based Drinking Water Value at MW-12S and arsenic exceeds the Part 201 DWC at MW-12S. No constituents were detected above Part 201 DWC or Residential and Non-Residential Health-Based Drinking Water Value in wells MW-21S and MW-21D located upgradient of the residential neighborhood adjacent to the east, west and south of the Site. Based on the variability of manganese concentrations across the Site, a pattern of manganese migration in groundwater at the Site is not apparent and concentrations in off-Site groundwater are anticipated to be variable as well. At times where groundwater elevations are lower and groundwater in the northwestern corner of the Site flow to the west-southwest rather than discharge to the river, arsenic and iron detected in MW-12S may be migrating off-Site.

Based on the information available to date, adequate data have been collected to show the extent of impacts to groundwater above Part 201 DWC and/or Residential and Non-Residential Health-Based Drinking Water Values is limited. Additionally, concentrations of metals in the wells nearest the western Site boundary are consistent with concentrations detected across the Site, with the exception of arsenic.

Exceedances of Part 201 DWC and/or Residential and Non-Residential Health-Based Drinking Water Values for arsenic, manganese and iron at MW-12S/D and MW-9 can be addressed through continued monitoring and implementation of institutional controls such as deed restrictions and/or a local ordinance against the use of groundwater as a drinking water source consistent with the proposed RAOs presented as part of the March 20, 2013 meeting.





NO

Revision

Date

Initial

0

75

150ft

LEGEND

--- PROPERTY BOUNDARY

--- TREE LINE

--- FENCE LINE

--- RAILROAD

--- SURFACE WATER

--- FORMER FEATURE

MW-16

MW-1

SG-3

MONITORING WELL LOCATION - PHASE I & II RI

ABANDONED MONITORING WELL LOCATION

STAFF GAUGES

EXCEEDANCE OF PART 201 RESIDENTIAL AND NON-RESIDENTIAL DRINKING WATER AND GROUNDWATER SURFACE WATER INTERFACE CRITERIA

EXCEEDANCE OF PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERIA

EXCEEDANCE OF PART 201 RESIDENTIAL AND NON-RESIDENTIAL DRINKING WATER CRITERIA

NOTE:  
LOW-LEVEL MERCURY SAMPLES WERE COLLECTED BETWEEN AUGUST 7th, and 9th, 2012

Residential Drinking Water

Non-Residential Drinking Water

Groundwater Surface Water

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status

Date

Initial

FORMER PLAINWELL, INC. MILL PROPERTY

PLAINWELL, MICHIGAN

PART 201 EXCEEDANCES IN GROUNDWATER

- MONITORING WELLS

CRA

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:

Reviewed By:

Date:

J.Q.

L.C.

APRIL 2013

Scale:

Project N°:

Report N°:

Drawing N°:

1:150

056394-07

MEMO015

figure 1

056394-07(MEMO015)GN-DE002 APR 19/2013

ATTACHMENT A  
GROUNDWATER CONTOUR MAPS

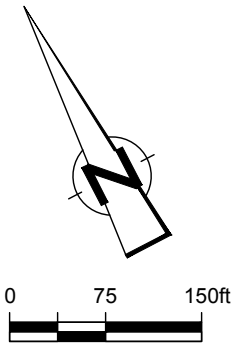








No	Revision	Date	Initial



- LEGEND
- PROPERTY BOUNDARY
  - TREE LINE
  - FENCE LINE
  - RAILROAD
  - SURFACE WATER
  - FORMER FEATURE
  - MW-5
  - SG-3
  - 713.2
  - 712.23
  - ←
- MONITORING WELL LOCATION - PHASE I & II RI  
STAFF GAUGES  
GROUNDWATER CONTOUR  
GROUNDWATER ELEVATION (2-5-10)  
DIRECTION OF GROUNDWATER FLOW

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



Approved

DRAWING STATUS

Status	Date	Initial

FORMER PLAINWELL, INC. MILL PROPERTY  
PLAINWELL, MICHIGAN

GROUNDWATER CONTOUR MAP - FEBRUARY 2010  
REMIDIAL INVESTIGATION REPORT



Source Reference:			
Project Manager:	Reviewed By:	Date:	
J. QUIGLEY	G. CARLI	FEBRUARY 2013	
Scale:	Project N°:	Report N°:	Drawing N°:
1:150	056394-06	007	figure 2.21



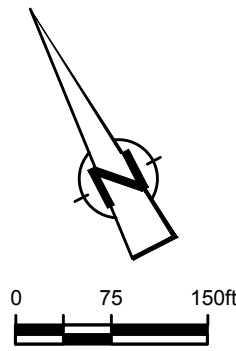








Nº	Revision	Date	Initial



LEGEND

- PROPERTY BOUNDARY
- TREE LINE
- FENCE LINE
- RAILROAD
- SURFACE WATER
- FORMER FEATURE
- MW-16 MONITORING WELL LOCATION - PHASE I & II RI
- MW-1 ABANDONED MONITORING WELL LOCATION
- SG-3 STAFF GAUGES
- 715.0 GROUNDWATER CONTOUR
- 715.29 GROUNDWATER ELEVATION (1-13-10)
- DIRECTION OF GROUNDWATER FLOW

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



Approved

DRAWING STATUS

Status	Date	Initial

FORMER PLAINWELL, INC. MILL PROPERTY  
PLAINWELL, MICHIGAN

REMEDIAL INVESTIGATION REPORT

GROUNDWATER CONTOUR MAP - OCTOBER 2012



CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date:
J.Q.	L.C.	OCTOBER 2012
Scale:	Project Nº:	Report Nº:
1:150	056394-06	007
		Drawing Nº:
		figure 2.24